Additively Manufactured Dynamically Adjustable Venturi, Phase I

Completed Technology Project (2018 - 2019)

Project Introduction

Parabilis Space Technologies is pleased to propose development of a novel additive manufacturing based design which enables creation of a dynamically-adjustable, in-line, cavitating flow-control and measurement venturi for use in advanced propulsion system ground testing. This innovative capability dramatically adds to and extends the advantages of using a cavitating venturi to isolate combustion chambers or other downstream process fluctuations from upstream feed pressure conditions. This design is expected to greatly simplify propulsion testing and reduce costs for cases where desired liquid flow conditions are either not precisely understood or cover a range of high-precision flow rates. The proposed geometry is capable of scaling to both ultra-high pressure and high flow rate applications.

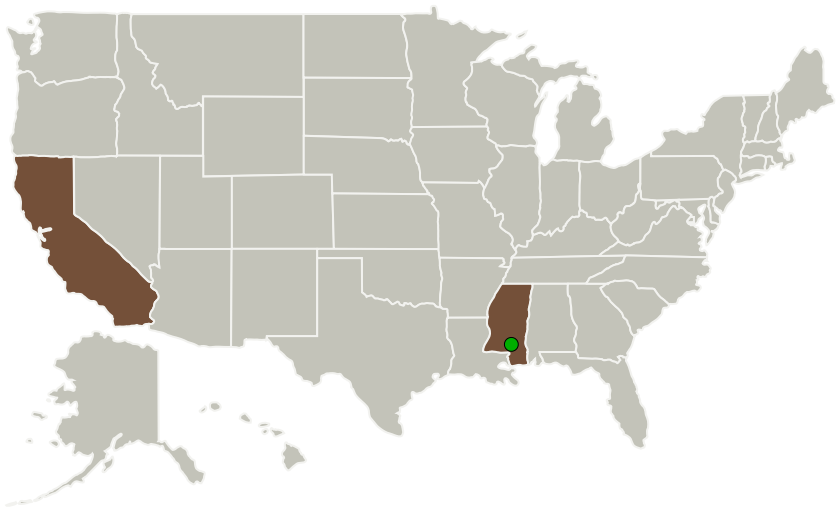
Anticipated Benefits

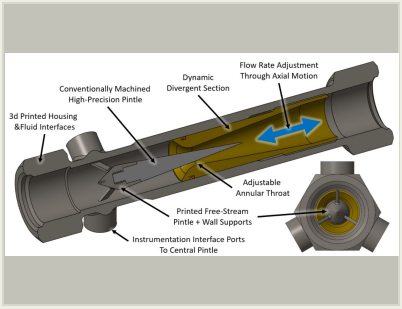
The proposed additive manufacturing technology provides significant benefit to a wide range of NASA applications, especially very high-pressure, high-flow, or extreme-temperature fluid applications such as hot hydrogen, LOX/methane, and LOX/H2.

Parabilis expects that there would be numerous commercial customers for the technology in the proposed innovation such as NTS or AMPT.

In addition to propulsion testing, there is a wider band of non-space industrial applications that require both precision flow control and variable flow rate that could be users of or customers for this innovation. Any company that uses precision flow meters is a potential customer.

Primary U.S. Work Locations and Key Partners





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Organizations Performing Work	Role	Type	Location
Parabilis Space Technologies, Inc.	Lead Organization	Industry Historically Underutilized Business Zones (HUBZones)	SAN MARCOS, California
Stennis Space Center(SSC)	Supporting Organization	NASA Center	Stennis Space Center, Mississippi

Primary U.S. Work Locations	
California	Mississippi

Project Transitions

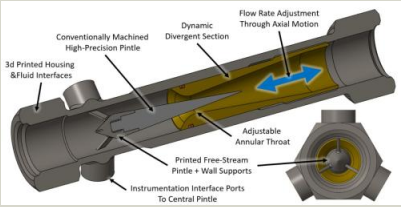
July 2018: Project Start

February 2019: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140905)*

Images



Briefing Chart Image
Additively Manufactured Dynamically Adjustable Venturi, Phase I
(https://techport.nasa.gov/image/135039)

Final Summary Chart Image
Additively Manufactured Dynamically Adjustable Venturi, Phase I
(https://techport.nasa.gov/image/132178)

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Parabilis Space Technologies, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Christopher S Grainger

Co-Investigator:
Chris Grainger

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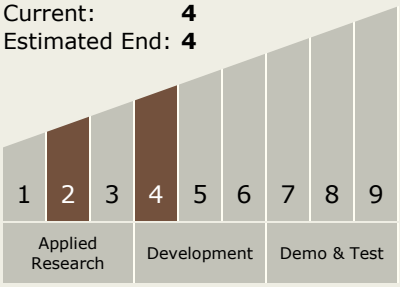
Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
  - TX13.1 Infrastructure Optimization
    - TX13.1.1 Natural and Induced Environment Characterization and Mitigation

Target Destination

Earth